

FORMS AND ARRANGEMENTS OF SCALES IN SPECIES OF *COLIAS* (LEPIDOPTERA: PIERIDAE)

BY P. H. H. GRAY

DIGBY, NOVA SCOTIA, CANADA

During an examination of the wings of males of *Colias eurytheme* Bdv. it was noted that the scales of the upper layer, both orange and yellow, are different in dimensions, shapes and colors from those of the under layer; this is especially clear in respect of the areas where the orange color predominates. The scales of the upper layer of the fore wing, between vein M_1 and the inner edge, exclusive of those lying adjacent to the veins, those of the cell-end spot, and those in the brown border, have entire (plain, not indented) distal ends. The scales of the under layer are partly visible wherever some of the upper scales have been slightly dislodged or removed; they are light yellow and have indented (crown) distal ends.

The arrangement of these scales on the wing can easily be seen under a $10\times$ ocular and 16 mm. objective, with incident light from a 60 watt lamp about 8–10 inches above the wing, the base of which is directed towards the lamp; the indentations of the crown scales will be cast in shadow onto the backs of the long scales adjacent to and forward of them.

The upper layer of scales can be partially removed to show the under layer *in situ* on the membrane, by placing a detached wing within a folded piece of typewriter carbon paper and applying gentle pressure in a light metal vise. The writer places the carbon paper containing the wing inside a folded piece of Bristol board, or similar stiff card, that within folded blotting paper, and the whole between two small pieces of Masonite, smooth side inwards; only experience can decide how much pressure to apply. The wax paper will, of course, remove scales from both surfaces of the wing, so that there will be three specimens suitable for mounting between glass microscope slides.

Removal of the upper layer of scales will reveal the lower layer sufficiently to allow measurement of the scales in their sockets, and the distances between the sockets. The scales are seen to be inserted in alternate sockets, the upper layer of plain scales hav-

ing been removed from the sockets between those occupied by the shorter crown scales. The sockets are 32μ apart. It has been found that the distance between the mid-longitudinal lines of the upper scales is 64μ , thus pointing up the fact that their pedicels occupied the alternate sockets 64μ apart. The mean width of both kinds of scales is 56μ .

The same arrangement of scales was found on the fore wings of *C. philodice* Gdt.; the upper layer of scales, however, is yellow on all parts of the wing, with only crown distal ends.

The diagrammatic sketch in Fig. 1 shows a hypothetically even and uniform arrangement of the scales; the two figures on the left represent scales of *eurytheme*, the remainder, those of *philodice*.

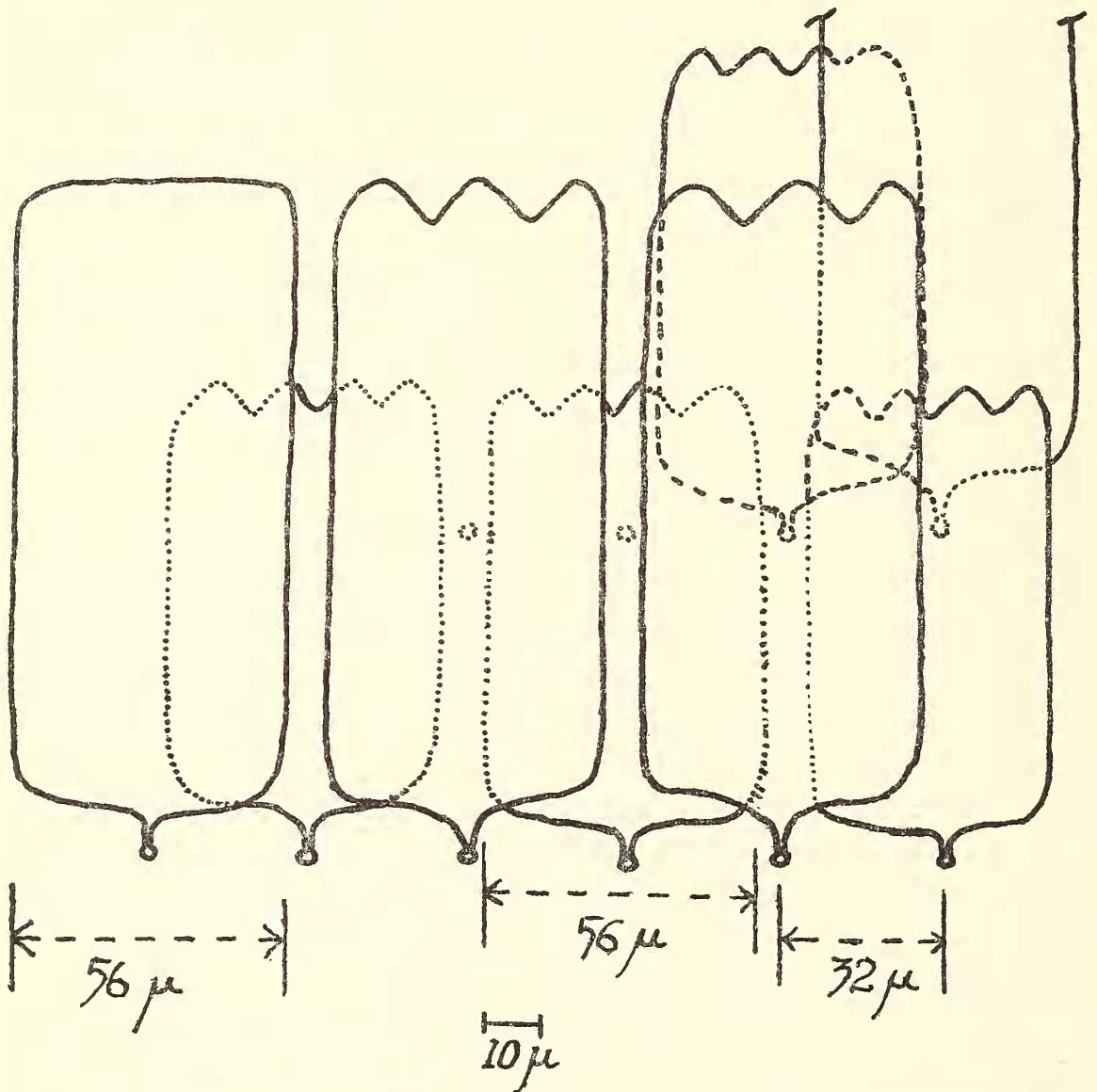


FIG. 1. Diagrammatic sketch of arrangement and forms of scales on the upper side of wings of *Colias eurytheme* and *C. philodice*.